

IN THE U.S. PATENT AND TRADEMARK OFFICE

Applicant: Hiroaki TANAKA et al. Conf.:  
Appl. No.: NEW Group: Unassigned  
Filed: July 30, 2001 Examiner: UNASSIGNED  
For: MULTI-PIECE SOLID GOLF BALL AND METHOD  
OF MAKING THE SAME

**PRELIMINARY AMENDMENT**

Assistant Commissioner of Patent  
Washington, D.C. 20231

July 30, 2001

Sir:

The following preliminary amendments and remarks are respectfully submitted in connection with the above-identified application.

**IN THE SPECIFICATION:**

Please amend the specification as follows:

Please replace the paragraph on page 6, lines 9-10, with the following rewritten paragraph:

--Fig. 1 is a schematic cross section illustrating one embodiment of the golf ball of the present invention;--

Please replace the paragraph on page 6, lines 11-13, with the following rewritten paragraph:

--Fig. 2 is a schematic cross section illustrating one

embodiment of the mold for producing the core outer layer of the golf ball of the present invention;--

Please replace the paragraph on page 6, lines 14-16, with the following rewritten paragraph:

--Fig. 3 is a schematic cross section illustrating one embodiment of the mold for producing the core of the golf ball of the present invention; and--

Please replace the paragraph on page 6, lines 17-19, with the following rewritten paragraph:

--Fig. 4 is a graphic illustration showing the relationship between the torque measured by a curastometer of the rubber composition of the present invention and time.--

Please replace the heading on page 6, line 20, with the following rewritten heading:

--DETAILED DESCRIPTION OF THE INVENTION--

Please replace the paragraph beginning on page 6, lines 21-25, bridging page 7, line 1, with the following rewritten paragraph:

--The present invention provides a multi-piece solid golf ball comprising a core composed of a center and a core outer layer

formed on the center, and a cover covering the core, wherein the core outer layer is formed from a rubber composition which does not contain a zinc salt of an unsaturated carboxylic acid.--

Please replace the paragraph on page 7, lines 4-5, with the following rewritten paragraph:

--(a) molding a rubber composition for a center in a spherical shape to form an unvulcanized rubber center,--

Please replace the paragraph beginning on page 8, lines 11-25, bridging page 9, lines 1-8, with the following rewritten paragraph:

--Fig. 2 is a schematic cross section illustrating one embodiment of the mold for producing the core outer layer of the golf ball of the present invention. Fig. 3 is a schematic cross section illustrating one embodiment of the mold for producing the core of the golf ball of the present invention. In the method of making the multi-piece solid golf ball of the present invention, a rubber composition for a core outer layer 7 is placed in a mold having a semi-spherical cavity 6, and either semi-vulcanized or heated to such a degree that the rubber composition neither semi-vulcanizes nor shrinks between the semi-spherical cavity and a male plug mold 5 as described in Fig. 2 to form a semi-vulcanized or unvulcanized semi-spherical half-shell for the core outer

layer. After removing the male plug mold 5, the unvulcanized center 1 is mounted on a concave of the semi-vulcanized or unvulcanized semi-spherical half-shell for the core outer layer 7 as described in Fig. 3, and a semi-vulcanized or unvulcanized semi-spherical half-shell for the core outer layer 7', separately formed in the same manner, is covered on the unvulcanized center, and integrally vulcanized to form a two-layered core 4. The core 4 is covered with the cover 3 to obtain a three-piece golf ball.--

Please replace the paragraph on page 9, lines 9-20, with the following rewritten paragraph:

--The term "semi-vulcanized" as used herein refers to a state wherein a rubber composition is vulcanized but vulcanization stops before the crosslinking reaction is completely finished. The semi-vulcanized article can keep its molded shape, and can be further vulcanized to complete the crosslinking reaction when heating again. The semi-vulcanization may be preferably adjusted to a condition that when a torque is measured by a curastometer, the difference between a minimum torque value immediately after starting vulcanization and a maximum torque value when the vulcanization is completed is controlled within the range of 5 to 80%.--

Please replace the paragraph beginning on page 9, lines 21-

25, bridging page 10, lines 1-23, with the following rewritten paragraph:

--A method of adjusting the condition of semi-vulcanization is as follows. The change of torque with time applied to a disc of the curastometer with time is measured from the unvulcanized state to the completely vulcanized state of the rubber composition. Fig. 4 is a graphic illustration showing the relation of a torque measured using a curastometer (JSR curastometer type III D manufactured by Orientech Co., Ltd.) from the unvulcanized state to the completely vulcanized state of the rubber composition with time. The larger the torque, the harder the rubber, because vulcanization is proceeded. The minimum torque value F appears at the time  $t_1$  immediately after starting the vulcanization, the torque gradually increases thereafter, and the maximum torque value G appears at the time  $t_4$  when the vulcanization is completed. In the present invention, the semi-vulcanized state means that when the torque is measured by a curastometer, a difference H between the minimum torque value F and the maximum torque value G is controlled within the range of 5 to 80%. If a torque I corresponding to 5% of the difference H appears at the time  $t_3$  and a torque J corresponding to 80% of the difference H appears at the time  $t_4$ , the semi-vulcanized state is obtained when vulcanization stops at a time between the time  $t_3$  and the time  $t_4$ . The measurement by the curastometer is conducted

according to JIS K 6300, except that it is conducted at a testing temperature of 160°C (it can be measured between 150 and 170°C) and an angle of amplitude of the disc of 3°.--

**REMARKS**

Claim 1 is now pending in this application.

Attached hereto is a marked-up version of the changes made to the application by this Amendment.

The present application is a divisional of parent application Serial No. 09/154,632, filed September 17, 1998, which is filed to pursue subject matter not covered or specifically claimed in the allowed claims of the parent application.

Favorable action and early allowance of the claims are respectfully requested.

Should the Examiner wish to contact Applicants' representative, he may do so by telephoning Edward H. Valance, Reg. No. 19,896, at (703) 205-8000 in the Washington Metropolitan area.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees

required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17;  
particularly, extension of time fees.

Respectfully submitted,

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Attachment: Version with Markings to Show Changes Made

**VERSION WITH MARKING TO SHOW CHANGES MADE**

**IN THE SPECIFICATION:**

The paragraph on page 6, lines 9-10 has been amended as follows:

Fig. 1 is a schematic cross section illustrating one embodiment of the golf ball of the present invention[.];

The paragraph on page 6, lines 11-13 has been amended as follows:

Fig. 2 is a schematic cross section illustrating one embodiment of the mold for producing the core outer layer of the golf ball of the present invention[.];

The paragraph on page 6, lines 14-16 has been amended as follows:

Fig. 3 is a schematic cross section illustrating one embodiment of the mold for producing the core of the golf ball of the present invention[.]; and

The paragraph on page 6, lines 17-19 has been amended as follows:

Fig. 4 is a graphic [illustrating a relation between a]



illustration showing the relationship between the torque measured by a curastometer of the rubber composition of the present invention and time.

The heading on page 6, line 20 has been amended as follows:

[SUMMARY] DETAILED DESCRIPTION OF THE INVENTION

The paragraph beginning on page 6, lines 21-25 and bridging page 7, line 1 has been amended as follows:

The present invention provides a multi-piece solid golf ball comprising a core composed of a center and a core outer layer formed on the center, and a cover covering the core, wherein the core outer layer is formed from a rubber composition which does not contain a zinc salt of an unsaturated carboxylic acid.

The paragraph on page 7, lines 4-5 has been amended as follows:

(a) molding a rubber composition for a center in a spherical shape to form an unvulcanized rubber center,

The paragraph beginning on page 8, lines 11-25, bridging page 9, lines 1-8 has been amended as follows:

Fig. 2 is a schematic cross section illustrating one embodiment of the mold for producing the core outer layer of the

golf ball of the present invention. Fig. 3 is a schematic cross section illustrating one embodiment of the mold for producing the core of the golf ball of the present invention. In the method of making the multi-piece solid golf ball of the present invention, a rubber composition for a core outer layer 7 is placed [to] in a mold having a semi-spherical cavity 6, and either semi-vulcanized or heated to such a degree that the rubber composition neither semi-vulcanizes nor shrinks between the semi-spherical cavity and a male plug mold 5 as described in Fig. 2 to form a semi-vulcanized or unvulcanized semi-spherical half-shell for the core outer layer. After removing the male plug mold 5, the unvulcanized center 1 is mounted on a concave of the semi-vulcanized or unvulcanized semi-spherical half-shell for the core outer layer 7 as described in Fig. 3, and a semi-vulcanized or unvulcanized semi-spherical half-shell for the core outer layer 7' separately formed in the same manner is covered on the unvulcanized center, and integrally vulcanized to form a two-layered core 4. The core 4 is covered with the cover 3 to obtain a three-piece golf ball.

The paragraph on page 9, lines 9-20 has been amended as follows:

The term "semi-vulcanized" as used herein refers to a state [that] wherein a rubber composition is vulcanized but

vulcanization stops before [completely finish] the crosslinking reaction is completely finished. The semi-vulcanized article can keep its molded shape, and can be further vulcanized to complete the crosslinking reaction when heating again. The semi-vulcanization may be preferably adjusted to a condition that when a torque is measured by a curastometer, [a] the difference between a minimum torque value immediately after starting vulcanization and a maximum torque value when the vulcanization is completed is controlled within the range of 5 to 80%.

The paragraph beginning on page 9, lines 21-25, bridging page 10, lines 1-23 has been amended as follows:

A method of adjusting the condition of semi-vulcanization is as follows. [Change] The change or torque with time applied to a disc of the curastometer with time is measured from the unvulcanized state to the completely vulcanized state of the rubber composition. Fig. 4 is a graphic [illustrating a] illustration showing the relation of a torque measured using a curastometer (JSR curastometer type III D manufactured by Orientech Co., Ltd.) from the unvulcanized state to the completely vulcanized state of the rubber composition with time. The larger the torque, the harder the rubber, because vulcanization is proceeded. The minimum torque value F appears at the time  $t_1$  immediately after starting the vulcanization, the torque gradually

increases thereafter, and the maximum torque value  $G$  appears at the time  $t_4$  when the vulcanization is completed. In the present invention, the semi-vulcanized state means that when the torque is measured by a curastometer, a difference  $H$  between the minimum torque value  $F$  and the maximum torque value  $G$  is controlled within the range of 5 to 80%. If a torque  $I$  corresponding to 5% of the difference  $H$  appears at the time  $t_3$  and a torque  $J$  corresponding to 80% of the difference  $H$  appears at the time  $t_4$ , the semi-vulcanized state is obtained when vulcanization stops at a time between the time  $t_3$  and the time  $t_4$ . The measurement by the curastometer is conducted according to JIS K 6300, except that it is conducted at a testing temperature of  $160^{\circ}\text{C}$  (it can be measured between  $150$  and  $170^{\circ}\text{C}$ ) and an angle of amplitude of the disc of  $3^{\circ}$ .